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SEMI-MELANISTIC WHITE-TAILED DEER IN NORTHERN WISCONSIN

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SEMI-MELANISTIC WHITE-TAILED DEER IN NORTHERN WISCONSIN -- Melanistic color morphs of white-tailed deer (*Odocoileus virginianus*) are differentiated from other recognized color morphs by having uniform black hairs on the dorsal surface with subdued black hairs on the ventral surface, dark face and ears, a distinctive mid-dorsal stripe extending from the head to the apex of the tail, and a tail with black dorsally and white ventrally (Baccus and Posey 1999). Melanism results from the overproduction of the skin pigment melanin and is considered rare in white-tailed deer populations (Severinghaus and Cheatum 1956, Sauer 1984, Smith et al. 1984).

Semi-melanistic deer have the same dark pelage colors as melanistic morphs, but patterns of white hairs are the same as those of normal color morphs (Baccus and Posey 1999). No literature records of melanism in white-tailed deer existed prior to 1929 (Seton 1929). Melanism has since been documented in north-central and southern Wisconsin (Anonymous 1948, Wozencraft 1979), South Carolina (Rue 1978), Michigan (Rue 1978), Texas (Smith et al. 1984, Baccus and Posey 1999), and Pennsylvania (D'Angelo and Baccus 2007). Semi-melanistic deer have been documented in New York (Townsend and Smith 1933), Idaho (Severinghaus and Cheatum 1956), and Texas (Baccus and Posey 1999). Herein, we report records for two semi-melanistic adult deer in northwestern Wisconsin.

On 9 and 19 September 2007 an adult (≥ 2.5 years of age) female and yearling (1.5 years of age) male white-tailed deer were photographed by a landowner using trail cameras (i.e., Bushnell Trail Scout Digital Trail Camera 2.1 MP with Night Vision) on private property approximately 0.5 km west of County Highway W and approximately 2.0 km south of Oliver in Superior Township, Douglas County, northwestern Wisconsin (Latitude: 46.66N, Longitude: 92.19W). Superior Township is located in Wisconsin's Northern Forest Deer Management Region (NFDMR). The NFDMR is comprised of approximately 38,850 km^2 of white-tailed deer range (i.e., all permanent cover including forest, woodlots, brush-covered land, or marsh ≥ 4 ha in size); 45 white-tailed deer management units (DMUs) occur within this region. Most DMUs within this region were > 80% forested by northern hardwoods (*Acer* spp., *Tilia* sp., *Fraxinus* sp.), quaking aspen (*Populus tremuloides*), balsam fir (*Abies balsamea*), pines (*Pinus* spp.), and swamp conifers including black spruce (*Picea mariana*) and tamarack (*Larix laricina*; Wisconsin Department of Natural Resources 2001). Primary land use is forestry and topography is moderately rolling hills with land elevations ranging from 183 to 594 m above mean sea level (Wisconsin Department of Natural Resources 2001).

The landowner submitted the photographs to the Wisconsin Department of Natural Resources for examination within 24 hours of retrieval. Based on morphological characteristics of melanistic and semi-melanistic deer (Baccus and Posey 1999), we classified these white-tailed deer as semi-melanistic.

The adult female white-tailed deer generally had a blackish slate-colored pelage dorsally and ventrally and was mottled with normal colored pelage on lateral surfaces, front and rear legs, dorsal surfaces of the ears, the head and muzzle, and the dorsal surface of the tail. The darkest region of coloration was the mid-dorsal stripe extending from the dorsal surface of the neck to the base of the tail. Patterns of white hairs were similar to those of typical white-tailed deer, including a white throat and underparts with areas of white extending across the nose, encircling the eyes, marking the insides of the legs and ears, ventral surface of the tail onto the anal region and as small tufts next to tarsal and metatarsal glands, and ventrally across the chest and abdomen.

The yearling male was characterized by dark gray colored pelage dorsally and laterally with normal colored pelage on the front and rear legs, dorsal surfaces of the ears, and the head and muzzle. The darkest regions of coloration were mid-dorsal and mid-ventral stripes extending from the dorsal surface of the neck to the scapula and from the ventral surface of the neck below the throat patch to the chest. A predominance of white hairs on several distinctive areas of the body (muzzle, ventral surface of the ears, medial surfaces of legs, eye ring, throat, ventral surface of the tail, small tufts next to tarsal glands, and ventrum) were similar to typical white-tailed deer pelage.

Occurrence of melanistic (and semi-melanistic) color morphs in mammalian populations varies both spatially and temporally, and generally is considered rare (Baccus and Posey 1999). We ruled out the Wisconsin white-tailed deer as another species of deer (fallow, *Dama dama*; and sika, *Cervus nippon*) with dark color morphs by two definitive characteristics of white-tailed deer: presence of white coloring on the ventral surface of the tail and antler structure.

Observations of melanistic color morphs are unusual in free ranging white-tailed deer populations. For instance, Burt (1946) and Ryel (1963) reported no melanism in Michigan deer populations. Melanism was first documented in white-tailed deer populations in northern Wisconsin in the 1940's (Anonymous 1948) and again in southern Wisconsin during 1976 (Wozencraft 1979). Semi-melanistic color morphs have not been documented previously in Wisconsin white-tailed deer, despite the fact that more than 2.3 million state residents have annually observed white-tailed deer in Wisconsin during the past 10 to 15 years (Wisconsin Department of Natural Resources 1998). Moreover, melanistic white-tailed deer are not protected from hunter harvest and more than 900,000 deer hunters annually pursue white-tailed deer in Wisconsin. However, despite annual harvests exceeding 500,000 white-tailed deer in recent years (Wisconsin Department of Natural Resources 1998), no melanistic or semi-melanistic white-tailed deer have been reported previously. Reports of only two similar color morphs during the past 60 years further confirm the rarity of these animals.

Observations of individual litters with melanistic and non-melanistic fawns suggest a genetic role for melanism in deer populations (Baccus and Posey 1999).

Melanistic white-tailed deer are thought to show recessive inheritance. Involvement of modifying genes also has been suggested (Severinghaus and Cheatum 1956, Rue 1978) with as many as six primary allelomorphic genes determining melanism in deer (Proto and Searle 1978). Distribution of black-brown color morphs in melanistic deer is continuous, indicating that different genes act to produce dark or completely black hair coats (Searle 1968). Polymorphism in melanistic mammals is known to result in various brown-black-gray color shades (Searle 1968). Hence, semi-melanistic white-tailed deer in Wisconsin suggested that sufficient genotypic variation existed to produce melanistic or semi-melanistic color morphs in certain white-tailed deer and non-melanistic color morphs in other white-tailed deer. Interestingly, the semi-melanistic female white-tailed deer also was observed with one non-melanistic fawn (i.e., presumably her offspring). Moreover, the described yearling male also was observed at the same trail camera location as the adult female and her non-melanistic fawn. It is unknown if the yearling male and adult female were related, although this seemed likely given the rarity of semi-melanism. Because two semi-melanistic white-tailed deer currently inhabit this area, possibly additional melanistic or semi-melanistic white-tailed deer are present or will be produced in the future. We do not think these occurrences will influence white-tailed deer population dynamics or future white-tailed deer management decisions in Wisconsin. Nevertheless, we consider these cases interesting incidents that warranted documentation given the paucity of information on melanism in the ecological literature.

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